WAMO WAMC

Washington Mathematics Competitions

WAMO Washington Mathematics Competitions

1st Annual

# WAMC 8

**Saturday, January 17, 2026**

## INSTRUCTIONS

1. DO NOT TURN TO THE NEXT PAGE UNTIL YOUR PROCTOR TELLS YOU TO BEGIN.
2. This is a 25-question multiple-choice competition. For each question, only one answer choice is correct.
3. Mark your answer to each problem on the answer sheet with a #2 pencil. Check blackened answers for accuracy and erase errors completely. Only answers that are properly marked on the answer sheet will be scored.
4. SCORING: You will receive 1 point for each correct answer, 0 points for each problem left unanswered, and 0 points for each incorrect answer.
5. Only blank scratch paper, blank graph paper, rulers, compasses, and erasers are allowed as aids. No calculators, smartwatches, phones, or computing devices are allowed. No problems on the competition will require the use of a calculator.
6. Figures are not necessarily drawn to scale.
7. Before beginning the competition, your proctor will ask you to record your name on the answer sheet.
8. You will have 40 minutes to complete the competition once your proctor tells you to begin.
9. When you finish, remain seated and follow your proctor's instructions.
10. Raise your hand if you have a question; your proctor cannot interpret the problems for you.

---

The problems and solutions for this WAMC 8 were prepared
by the WAMO WAMC 8 Editorial Board under the direction of
Kaiyuan Mao and Vivaan Mukherjee, co-Editors-in-Chief.

The WAMO WAMC office reserves the right to disqualify scores from a school if it determines that the rules or the required security procedures were not followed.

The publication, reproduction, or communication of the problems or solutions of this competition during the period when students are eligible to participate seriously jeopardizes the integrity of the results. Dissemination via phone, email, or digital media of any type during this period is a violation of the competition rules.

The WAMO WAMC office retains final authority over the administration, scoring, and interpretation All decisions of the WAMO WAMC office regarding the administration and scoring of this competition are final.

© 2026 Washington Math Organization

1. What is the value of $1111000 + 111100 + 11110 + 1111$?

   **(A)** $123,321$ **(B)** $1,223,321$ **(C)** $1,234,311$ **(D)** $1,234,321$ **(E)** $1,234,567$

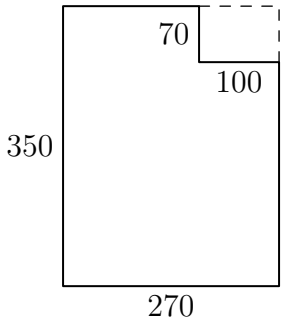
2. Ryan writes $3$ math problems for WAMO every $2$ days. If he needs to write a $10$-problem contest, a $25$-problem contest, and a $1$-problem contest, how many days will it take him to write all the problems?

   **(A)** $12$ **(B)** $24$ **(C)** $30$ **(D)** $32$ **(E)** $36$

3. While writing problems, Ryan uses a spinner with three labeled regions, $G$, $A$, and $N$, to choose which type of problem to write next. Region $G$ has twice the area of region $A$, and region $A$ has twice the area of region $N$. What is the probability that the spinner lands on region $A$?

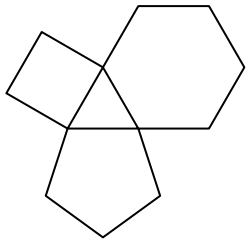
   **(A)** $\frac{1}{7}$ **(B)** $\frac{2}{7}$ **(C)** $\frac{1}{3}$ **(D)** $\frac{2}{5}$ **(E)** $\frac{4}{7}$

4. A simplified map of Utah is approximated as a rectangle with a smaller rectangle cut out as shown below. All lengths are in miles. What is the area of this figure?




   **(A)** $59,500$ **(B)** $75,600$ **(C)** $85,000$ **(D)** $87,500$ **(E)** $93,800$

5. A square, a regular pentagon, and a regular hexagon are constructed externally on the three sides of an equilateral triangle so that each polygon shares exactly one full side with the triangle. If the triangle has side length $6$, what is the perimeter of the resulting figure shown below?



   **(A)** $72$ **(B)** $84$ **(C)** $90$ **(D)** $96$ **(E)** $108$

6. Jason learns that the Six-Day War lasted from the beginning of June 5, 1967, to the end of June 10, 1967. Assuming the war progressed uniformly over time, on which day was the war $40\%$ complete?

   **(A)** June 5 **(B)** June 6 **(C)** June 7 **(D)** June 8 **(E)** June 9

7. Wesley defines a rule that takes a number $x$ and transforms it to $\frac{x+1}{x-1}$. Starting with $2$, he applies the rule three times. What number does he obtain?

   **(A)** $2$ **(B)** $\frac{5}{2}$ **(C)** $3$ **(D)** $4$ **(E)** $5$

8. James is interested in palindromes, which are numbers that read the same forwards and backwards, such as $121$ or $434$. How many positive three-digit palindromes have a digit sum equal to $8$?

   **(A)** $1$ **(B)** $2$ **(C)** $4$ **(D)** $7$ **(E)** $8$

9. Let $a \circ b$ be the larger of the positive integers $a$ and $b$, and let $a \square b$ be the smaller. If

$$(a \circ b) + (a \square b) = 5,$$

   how many ordered pairs $(a, b)$ of positive integers satisfy this condition?

   **(A)** $2$ **(B)** $3$ **(C)** $4$ **(D)** $5$ **(E)** $6$

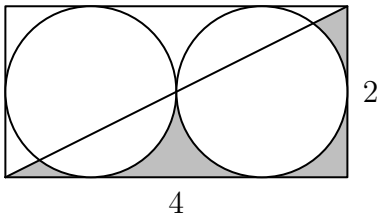
10. Patrick sketches a square with two opposite vertices at $(-2, 4)$ and $(3, 7)$. This square has the same area as a right triangle with one leg of length $4$. What is the length of the other leg of the triangle?

    **(A)** $\frac{17}{2}$ **(B)** $9$ **(C)** $\frac{17\sqrt{2}}{2}$ **(D)** $17$ **(E)** $17\sqrt{2}$

11. Vivaan is covering a $4 \times 6$ rectangular floor with $1 \times 1$ square tiles. Each tile is either blue or white, and any two tiles that share a side must be different colors. The tile in the upper-left corner is blue. If a blue tile costs \$2 and a white tile costs \$3, what is the total cost to cover the floor?

    **(A)** $45$ **(B)** $48$ **(C)** $50$ **(D)** $54$ **(E)** $60$

12. A $4 \times 2$ rectangle contains two congruent circles, each tangent to the top and bottom of the rectangle and tangent to each other. A diagonal is drawn from the lower-left corner to the upper-right corner. Find the area of the shaded region shown.




    **(A)** $4 - \pi$ **(B)** $8 - 2\pi$ **(C)** $3$ **(D)** $\pi$ **(E)** $2\pi$

13. Laura notices several small numbers written on a whiteboard and starts looking for patterns among them. She notices that they are four distinct numbers from $1$ through $9$ such that exactly two are prime, exactly two are perfect squares, exactly two are even, and exactly two are multiples of $3$. What is the sum of the four numbers?

    **(A)** $15$ **(B)** $18$ **(C)** $20$ **(D)** $21$ **(E)** $22$

14. How many ordered quadruples $(a, b, c, d)$ of one-digit positive integers satisfy

$$\frac{ab}{cd} = \frac{a}{c} \div \frac{b}{d},$$

    where $ab = a \cdot b$ and $cd = c \cdot d$?

    **(A)** $729$ **(B)** $810$ **(C)** $900$ **(D)** $1,000$ **(E)** $1,024$

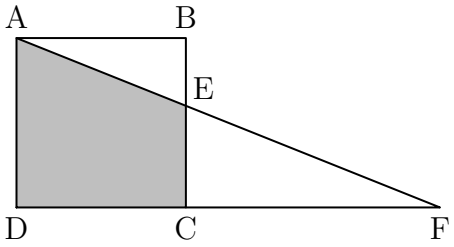
15. After the AMC 10, four students Alex, Kaiyuan, Jackson, and Kevin each make a statement about their scores. Assume no two students received the same score.

    - Alex says, "I got the highest score."
    - Kaiyuan says, "I did not get the lowest score."
    - Jackson says, "I did worse than Alex, but I did not get the lowest score."
    - Kevin says, "I got the lowest score."

    Exactly one of these statements is false. Determine the order of Alex, Kaiyuan, Jackson, and Kevin from highest score to lowest score.

    **(A)** Alex, Kaiyuan, Jackson, Kevin **(B)** Kaiyuan, Jackson, Alex, Kevin
    **(C)** Kaiyuan, Alex, Kevin, Jackson **(D)** Alex, Jackson, Kaiyuan, Kevin
    **(E)** Kaiyuan, Alex, Jackson, Kevin

16. Square $ABCD$ has side length $8$. Point $E$ lies on segment $BC$. Line $AE$ intersects line $DC$ at $F$. If $DF = 20$, find the area of quadrilateral $ADCE$.




    **(A)** $28.8$ **(B)** $35.2$ **(C)** $50$ **(D)** $51.2$ **(E)** $57.6$

17. The only valid element symbols are Ga, As, Sg, and S. No symbol has more than two letters, and neither G nor A by itself is a valid symbol. Consider the string GASGASGAS. You may group consecutive letters of the string to form element symbols, ignoring capitalization (for example, GA can represent Ga). In how many different ways can the string be broken into valid element symbols?

    **(A)** $1$ **(B)** $2$ **(C)** $3$ **(D)** $4$ **(E)** $5$

18. A $5$-digit password formed using only the digits $1$ and $2$. It contains more $2$s than $1$s, is divisible by $3$, and is not divisible by $4$. What is the sum of all such passwords?

    **(A)** $22,212$ **(B)** $55,556$ **(C)** $55,566$ **(D)** $77,778$ **(E)** $77,787$

19. Bruce is picking oranges from a tree. Exactly $1\%$ of oranges on the tree are blue, and the rest are orange. The first orange Bruce picks is blue. If the probability that the second orange he picks is blue is $\frac{1}{111}$, how many oranges were on the tree at the start?

    **(A)** $500$ **(B)** $700$ **(C)** $800$ **(D)** $1,000$ **(E)** $1,300$

20. A crystal is formed by attaching two congruent square pyramids to the two square faces of a square prism. The side length of the square base of the prism is $3$, and a space diagonal of the prism has length $3\sqrt{6}$. The distance between the two pyramid apexes is $12$. What is the volume of the crystal?

    **(A)** $63$ **(B)** $72$ **(C)** $81$ **(D)** $90$ **(E)** $108$

21. Let $n$ be the least positive integer such that $n$ has exactly $10$ positive divisors and $2n$ has exactly $15$ positive divisors. How many positive divisors does $n^2$ have?

    **(A)** $18$ **(B)** $20$ **(C)** $24$ **(D)** $25$ **(E)** $27$

22. How many integers of the form $a^a$ satisfy

$$2^9 < a^a < 2^{25},$$

    where $a$ is a positive integer?

    **(A)** $1$ **(B)** $2$ **(C)** $3$ **(D)** $4$ **(E)** $5$

23. A number is called *diabolical* if it contains the consecutive digits $14$ or $34$. For example, $9341$ and $1434$ are diabolical, but $3574$ is not. How many four-digit diabolical numbers are there?

    **(A)** $556$ **(B)** $560$ **(C)** $576$ **(D)** $596$ **(E)** $600$

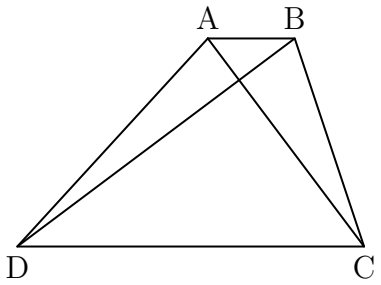
24. A three-digit integer $n$ has the following property:

    - when $1$ is subtracted from $n$, the result is divisible by $2$;
    - when $3$ is subtracted from $n$, the result is divisible by $4$;
    - when $5$ is subtracted from $n$, the result is divisible by $6$;
    - $\ldots$
    - when an odd integer $k$ is subtracted from $n$, the result is divisible by $k+1$.

    Find the value of $k$ for which there is exactly one possible value of $n$.

    **(A)** $7$ **(B)** $9$ **(C)** $11$ **(D)** $13$ **(E)** $15$

25. In trapezoid $ABCD$, $AB \parallel CD$. Suppose the diagonals $AC$ and $BD$ have lengths $3$ and $4$, respectively, and $AB + CD = 5$. Find the area of trapezoid $ABCD$.




    **(A)** $\frac{9}{2}$ **(B)** $5$ **(C)** $6$ **(D)** $\frac{15}{2}$ **(E)** $10$